WHAT IS CLAIMED IS:

1. A probe for acoustic emission detection of insect infestation comprising:

a waveguide rod formed of substantially solid material having at one end a substantially pointed conical end for entering a bore-hole in wood and a generally planner face at the opposite end, said face being substantially perpendicular to the axis of said rod;

a piezoelectric transducer having a generally planar face;

an acoustic couplant between said face of said waveguide and the face of said transducer;

a preamplifier electronically connected to the output of said transducer; and

a housing retaining said waveguide at one end and housing said transducer and said preamplifier.

2. The probe of Claim 1, wherein said transducer comprises:

a plurality of polarized piezoelectric crystals formed into cylinders; and

a thin layer of conductive epoxy securing juxtaposed faces of said cylinders in a coaxial array.

3. The probe of Claim 2, wherein said conductive epoxy contains silver.

4. The probe of Claim 1, including an input stage that is a charge converter.

5. The probe of Claim 1, coupled to an output stage comprising:

an operational amplifier having positive feedback and functioning as a comparator with hysterisis.

6. The probe of Claim 1, coupled to an output stage that divides the peak amplitudes of frequency components in a high frequency range of frequency (HF) by the peak amplitudes of frequency components in a low frequency range of frequencies (LF).

7. The probe of Claim 6, wherein the accuracy of insect infestation detection is improved by removing HF/LF ratios below a predetermined value.

8. The probe of Claim 6, wherein said high frequency signals are in substantially the range of 25 KHz to 50 KHz.

9. The probe of Claim 6, wherein said low frequency signals are in substantially the range of 25 KHz to 25 KHz.

10. A piezoelectric transducer for detecting insect infestation using acoustic emission comprising:

a plurality of polarized piezoelectric crystals formed into cylinders, and

a thin layer of conductive epoxy securing juxtaposed faces of said cylinders in a coaxial array.

11. A waveguide for coupling a piezoelectric transducer to wood for detecting insect infestation comprising:

a substantially solid metal rod having a conical point at one end for entering a bore-hole in said wood; and

a generally planar end perpendicular to the axis of said rod adapted to engage a face of a piezoelectric transducer.

12. An apparatus for detecting the movement of insects comprising acoustic emission means including a waveguide for detecting the in-plane, ultrasonic signals generated by the movement of insects in wood and producing electrical signals therefrom, means for processing said electrical signals into a high frequency band and a low frequency band and dividing the peak amplitudes of signals within said high frequency band with the peak amplitudes of signals within said low frequency band.

13. An apparatus for detecting the movement of insects in a wooden object, the apparatus comprising:

an object comprised substantially of wood;

a waveguide adapted to be placed into said object to convey mechanical waves generated by insect movement within said object;

an ultrasonic transducer connected to the other end of said waveguide device to convert said mechanical waves into an electrical signal;

a preamplifier connected to said ultrasonic transducer to amplify said electrical signal; and

processing said amplified electrical signal to detect in plane (IP) insect activities traveling along the grain of said wood.

14. A method for detecting the presence of insects in wood, the method comprising the steps of:

drilling a hole into an object comprised of wood;

fastening a waveguide end into said hole;

recording the number of events detected within said object over a set period of time;

disturbing said object;

promptly re-recording the number of events detected within said object over a second set period of time; and

comparing the activity of said recording with said re-recording.

15. A method for detecting the presence of insects in wood comprising:

drilling a hole into said wood;

fastening one end of a waveguide into said hole; and

using said waveguide to access extensional in plane stress waves created by termite or other insect activity.

16. A method of constructing an acoustic emission probe comprising:

drilling a hole through a cylindrical piezoelectric crystal; and

stacking a plurality of such drilled crystals.

17. A system for determining that an insect eradication treatment procedure is successful, comprising:

a plurality of addressable acoustic emission detectors adapted to be located throughout a structural infested with termites or other insects;

a multiplexor coupled to said detectors for measuring in plane insect activity at the locations of said detectors; and

a monitoring device coupled to said plurality of detectors during treatment of said structure.

18. A system having:

a plurality of addressable acoustic emission detectors adapted to be located throughout a structural infested with termites or other insects; and

a multiplexor coupled to said detectors for measuring in plane insect activity at the locations of said detectors.

19. The method of treating a structure for termite infestation comprising:

locating throughout the structure one or a plurality of transducers adapted to in-plane, ultrasonic signals generated by termites;

monitoring said transducers for termite activity during the treatment process; and

continuing said treatment process until said transducers cease producing output signals.

20. The method of Claim 18 comprising:

measuring the time between the start of said treatment process and the cessation of acoustic signals indicative of termite activity.

21. The method of Claim 18 comprising:

further monitoring of said transducers after cessation of output signals to determine if any termite activity has occurred, and repeating said treatment process.

22. Acoustic emission detector apparatus for termite detection comprising:

a waveguide adapted to be inserted into the wood being tested for termites;

a piezoelectric transducer coupled to said waveguide, said combination of waveguide and piezoelectric transducer producing electrical signals from termites in a frequency band of about 25-50 KHz that are substantially larger in amplitude than the amplitudes of the acoustic noise product in said frequency band.